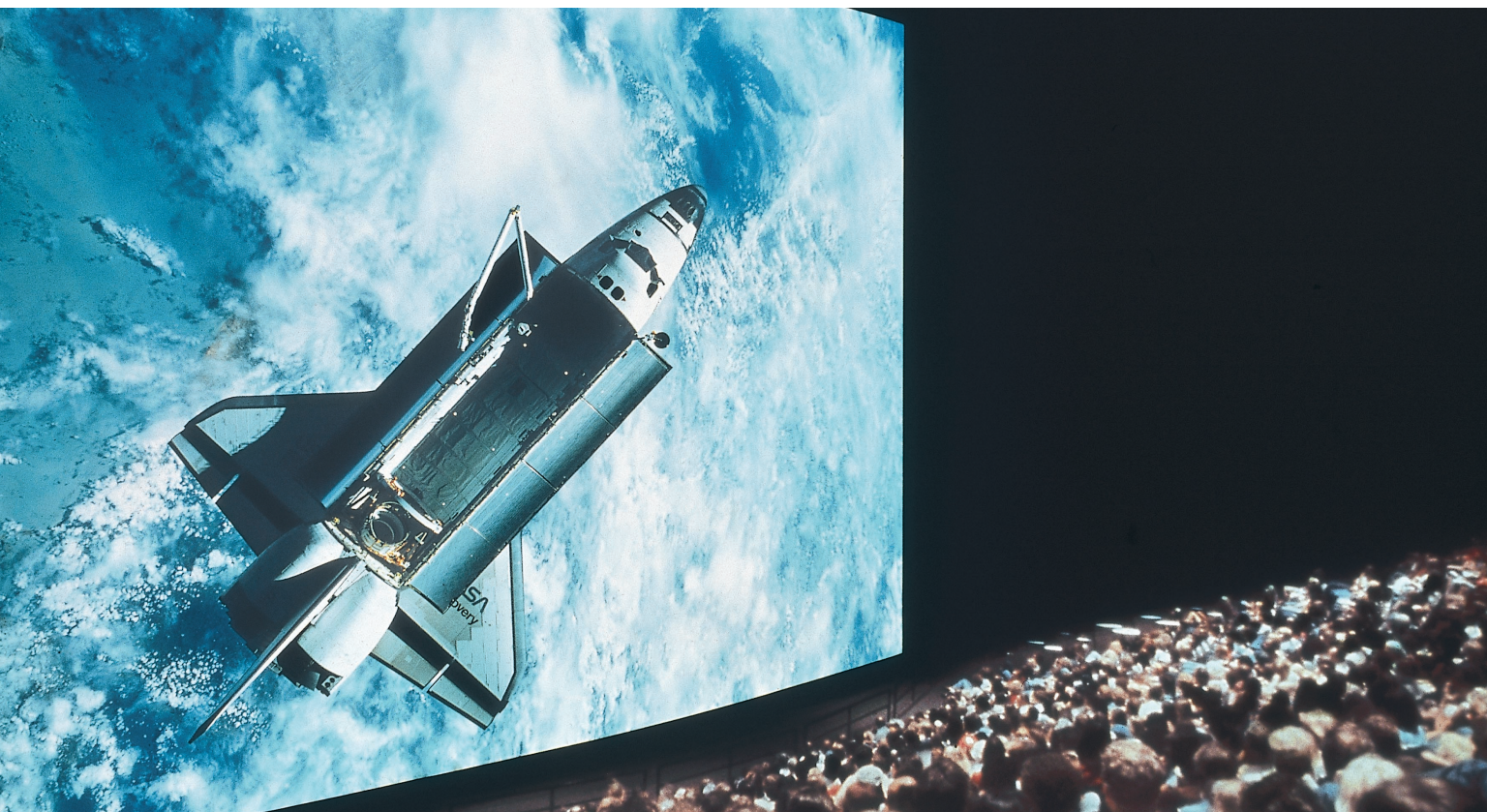


The BIG Motion Picture: An IMAX Interview



“Filling people’s peripheral vision with image to the point that they lose the sense of actually watching a picture and become totally absorbed in the medium” is the goal of the IMAX Corporation, which has been making and screening large-format films since 1970. Former IMAX executive vice-president of technology Michael Gibbon went on to say in a recent interview, “If you give people a very large image, you can almost disconnect them from reality. They become very involved with the ‘thing’ they are seeing.”

IMAX develops and supplies all of the equipment used by filmmakers and theatres to create an exciting and enthralling film experience — the camera, the projector, and even the enormous movie screen.

The roots of the IMAX system go back to Montréal’s Expo ’67, where films shown simultaneously on multiple wide screens by several standard 35 mm movie theatre projectors became very popular. A small group of Canadians involved in making some of those films decided to design a new system using a single, powerful projector, rather than the cumbersome multiple projectors. The resulting IMAX system premiered at Expo ’70 in Osaka, Japan, and the first permanent IMAX projection system was installed at Toronto’s Ontario Place in 1971. In 1997, IMAX Corporation won an Oscar, the highest award of the Academy of Motion Picture Arts and Sciences, for scientific and technical achievement.

We spoke to Gibbon, who joined IMAX in 1986 and is now a consultant to the corporation, about the technical challenges IMAX faces when producing its large-screen films.

Q: How did IMAX create the technology to give people this sense of total immersion in the image?

A: Sensibly, IMAX chose the largest film format that was commercially available, rather than have Kodak produce something new. It was 70 mm, but IMAX turned it on its side and advanced it 15 perforations at a time.

Q: Can you explain a bit more about the film stock and film frames?

A: A filmstrip is a series of individual frames with perforations that run along the sides to help feed film through the projector. Today's cinemas show films with a frame size of 35 mm and advance it four perforations at a time. 70 mm existed when our corporation was starting up, but IMAX's choice of advancing it 15 perforations at a time was fairly revolutionary.

Q: What was the first challenge?

A: There were a number of 70 mm projectors in existence from quite early in the history of cinema, advancing five perforations of film at a time. There were many more 35 mm projectors advancing four perforations of film at a time. Our challenge was to move a format three times larger than 70 mm/5 perforations, and to do that in such a way that the film and film frame not only survived the process, but also were steady when projected. We needed steadiness because we were going to sit people very close to a very large image.

Q: In terms of film motion, what was the problem, exactly?

A: It's the sheer dynamics of the film. You're trying to advance the film quickly. You need to run it at 24 frames per second. That's the standard rate of film advancement. Also, the 35 mm mechanism is fairly rough on a film. It has a high acceleration rate, so the stresses on the perforations are not minor — you can damage the film. When the frame comes to a rest, it can deform, particularly around the perforations, so that you're not absolutely sure where you're going to finish up.

Q: So the frame “overshoots” too far or “undershoots” not far enough?

A: Yes, this was a known problem in the 35 mm projectors. The IMAX Rolling Loop projector was created to solve the problem of advancing more film quickly, yet making sure that the film was firmly in place for exposure in the aperture. The fundamental advantage it has over the 35 mm projectors is fixed registration pins.

Q: Where are registration pins? How do they work?

A: They are pins that are fixed on either side of the aperture. They simply hold the film in place when it is being illuminated.

Q: How does the Rolling Loop work?

A: There is a rotor and on the periphery of that rotor are a total of eight gaps. The film is induced to build or loop up into the gaps, and the rotor rotates. Essentially, what it's doing is lifting up the film, putting it into the gap, and rolling it along.

Q: Did you experiment with different interior motions inside the projector?

A: What evolved after a number of experiments was a deceleration cam. This takes the film, which is coming in at almost two metres per second, grabs it in the last part of its travel, slowly brings it down in a controlled manner and then puts it onto the registration pins at a very low final velocity. The pins hold the frame in a very precise location and then it's vacuumed up against the lens to keep the entire frame in focus.

Q: What are you looking at for the future?

A: Digital is an obvious consideration, but the image quality is not at the level of film. It doesn't yet have the ability to depict fine detail or to produce the same amount of light. But we're working on it.

Making Connections

1. IMAX films are known for creating a sense of motion, instead of simply showing a picture of it. How does IMAX do this?
2. Research the differences between the IMAX Rolling Loop projector and a standard 35 mm projector.